

### **REMARKS**

Claims 26, 27, 36-38, 40-42, and 49-70 are canceled without prejudice. Claims 71-85 are newly added. Claim 1-23, 47, and 48 are withdrawn. With entry of this amendment, claims 24, 25, 28-35, 39, 43-46, and 71-85 will be pending.

Claims 24, 25, 28-35, 39, and 43-46 are amended. Claim 24 is amended to incorporate the subject matter of claims 26, 27, 36-38, 40, and 42. Support for the amendment to claim 24 can be found at least in original claims 26, 27, 36-38, 40, and 42. Claim 24 is also amended to specifically recite a system with component parts. Support for this amendment can be found at least at paragraphs [0022] to [0025] of the published application. Claims 25, 28-35, 39, and 43-46 are amended to agree with amended claim 24, from which these claims depend. No new matter has been added by way of these amendments.

### **Rejections Under 35 U.S.C. § 112 ¶ 1**

Claims 24-46 are rejected under 35 U.S.C. § 112, ¶ 1 as failing to comply with the enablement requirement. The examiner asserts that the term "composition" indicates that the components are included in the same mixture. Once the components are mixed, a reaction takes place changing the nature of the composition. Thus, it is not possible to prepare a composition comprising the elements of original claim 1.

Claim 1, as amended, now recites a "system" comprising multiple components. The individual components are stable, and do not undergo a reaction until mixed. Withdrawal of the rejection of claim 24 under 35 U.S.C. § 112, ¶ 1 is respectfully requested in view of this amendment.

Claims 25, 28-35, 39-40, and 42-46 were rejected under 35 U.S.C. § 112, ¶ 1 for being dependent upon rejected claim 24. Because the rejection of claim 24 has been overcome, Applicants respectfully request the withdrawal of the rejection of claims 25, 28-35, 39, and 43-46 under 35 U.S.C. § 112, ¶ 1.

### **Rejections Under 35 U.S.C. § 112 ¶ 2**

Claims 36-42 are rejected under 35 U.S.C. § 112, ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Claims 24 and 39 have been amended appropriately. Notably, claim 24 now includes the elements of former claims 36 and 37, and recites "w/w of solution"; claim 39 has been amended to remove reference to "the solution." Because claims 40-42 are canceled, the rejection is rendered moot.

Withdrawal of the rejection of claims 24, 39-40, and 42 under 35 U.S.C. § 112, ¶ 2 is respectfully requested.

### **Prior Art Rejections**

Independent claim 24 and dependent claims 25, 28-35, 39, 43-46 stand variously rejected under 35 U.S.C. §§ 102(b) & 103(a). Claims 24-34, 38-46 are rejected under 35 U.S.C. § 102(b) as being anticipated by WO 02/23993 to Ecolab ("Ecolab"). Claims 24-33, 36-37, and 43-44 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,231,830 to Madray ("Madray"). Claims 24-35 and 38-46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ecolab in view of U.S. Patent Application Publication No. 2001/0038805 to Hamilton ("Hamilton"). Claims 24-46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Madray in view of Ecolab, and further in view of Hamilton.

Claim 24 is rejected under 35 U.S.C. § 102(b) as being anticipated by Ecolab.

Ecolab discloses a biocidal composition, designed for the generation of chlorine dioxide, comprising at least one iodo-compound having at least one iodine atom and a source of chlorite ions. Abstract. The molar ratio of chlorite ions to iodine atoms is 2 or greater. Abstract. The composition may further comprise an acid. Pages 10 and 21.

Ecolab does not teach or suggest a multi component chlorine dioxide producing sanitizing and disinfecting system, wherein the first component comprises a chlorite present in an amount less than 300 ppm (w/w of solution), as is recited in amended claim 24. In fact, Ecolab does not teach or suggest a multi component sanitizing and disinfecting system with chlorite levels less than 883 ppm. Ecolab, page 45. Because Ecolab does not disclose a multi component chlorine dioxide producing sanitizing and disinfecting system having the features recited in amended claim 24, Ecolab does not anticipate claim 24. Withdrawal of the rejection of claim 24 under 35 U.S.C. § 102(b) is, thus, respectfully requested.

Claim 24 is also rejected under 35 U.S.C. § 102(b) as being anticipated by Madray.

Madray discloses a method for manufacturing molecular chlorine dioxide, by the addition of potassium iodide to a solution of alkali metal chlorite. Abstract. The metal chlorite and the potassium iodide are kept separate, until the need for the generation of chlorine dioxide arises. Abstract. Madray discloses the use of buffers to maintain the pH at approximately 6.2. Col. 6, Ins. 2-3.

Madray does not teach or suggest a multi component chlorine dioxide producing sanitizing and disinfecting system with a pH less than 5, as is recited in claim 1. Because Madray does not disclose a multi component chlorine dioxide producing sanitizing and

disinfecting system having the features recited in amended claim 24, Madray does not anticipate claim 24. Withdrawal of the rejection of claim 24 under 35 U.S.C. § 102(b) is, thus, respectfully requested.

Claim 24 is also rejected under 35 U.S.C. § 103(a) as being unpatentable over Ecolab in view of Hamilton.

Hamilton discloses a device comprising an envelope, and a sachet within the envelope that contains reactant, which generates  $\text{ClO}_2$  in the presence of an initiating agent, e.g., water. Abstract. The device primarily generates  $\text{ClO}_2$  via acid activation of chlorite, using citric acid or some other mild acid as the activator. Paragraphs [0055] to [0060]. Hamilton does not teach the use of iodide.

One of skill in the art, considering Ecolab, would have no reason to combine the teachings of Hamilton with Ecolab to achieve the subject matter of claim 24. Hamilton is not directed to methods for generating  $\text{ClO}_2$  by mixing solutions together, but is rather directed to methods of generating  $\text{ClO}_2$  by contacting sachets filled with dried materials with water, wherein the water acts as an initiator.

Even assuming, *arguendo*, that Ecolab and Hamilton were combinable, Applicants respectfully submit that Ecolab and Hamilton, taken separately or in combination, do not teach or suggest the subject matter of claim 24. Ecolab does not teach or suggest the concentrations of chlorite that are recited in claim 24. Hamilton does not cure this deficiency, as Hamilton does not teach or suggest the use of dilute solutions of chlorite for the generation of  $\text{ClO}_2$ . Accordingly, withdrawal of the rejection of claim 24 under 35 U.S.C. § 103(a) is, thus, respectfully requested.

Claim 24 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Madray in view of Ecolab, and further in view of Hamilton.

Madray discloses a method of generating  $\text{ClO}_2$  using lower concentrations of chlorite and reducing agent, however Madray does not disclose the  $\text{ClO}_2$  concentration produced in less than five minutes. The  $\text{ClO}_2$  concentrations presented in Madray were all taken at 30 minutes reaction time. Col. 6, Ins. 42-44 and col. 7, Ins. 10-11. Madray discloses basic solutions having a pH range of 12.8 to 9.8, and buffered solutions having a pH of 6.2. Col 5, Ins. 58-65, and col 6, lines 38-39. Madray's only discussion of a pH below 5 is in Example 8, where Madray discusses adding a solution containing generated  $\text{ClO}_2$  to an acidic glycerin base to make a skin cleanser. Col. 8, Ins. 3-7. Madray nowhere suggests a system for generating  $\text{ClO}_2$  having a component with a pH less than 5.

As set forth in applicant's specification, in many commercial applications, long generation times are inconvenient and may cause safety concerns because the effectiveness of the disinfectant may be unknown at the time of use. "The invention allows for the reaction time to be reduced to a low level so that the invention can be used without long delays while still not being instantaneous, allowing the invention to be used *in situ* which eliminates the loss of chlorine dioxide and loss of effectiveness." Paragraph [0011] of the published application.

The examiner, however, alleges that generation times of "less than 30 minutes" fairly suggests the claimed "less than 5 minutes." Applicants respectfully disagree with the examiner's contention. A fairer reading of Madray, taking into consideration the context of the examiner's citation, would more reasonably suggest something slightly less than 30 minutes, and not the commercially significant five minutes as recited in claim 24. Furthermore, Madray does not teach or suggest an activator present in an amount sufficient to reduce pH to 5 or lower, let alone that "the activator . . . which reduces the pH levels to 5 or lower . . . aids in the rapid reaction rate in order to produce effective amounts of chlorine dioxide." Paragraph [0020] of the published application. "The chlorite, the activator and the chloride are in amounts that will produce an effective amount of chloride dioxide in less than 5 minutes . . ." *Id.*

Ecolab achieves generation times under five minutes by employing chlorite concentrations greater than those of amended claim 24. Ecolab may mention, in passing, a very wide range of pH (in fact, almost the entire pH gamut in 1-11), however, a closer read of Ecolab reveals a teaching away from acidic compositions. Specifically, Ecolab teaches that acidic compositions can irritate the skin, and may be destructive to equipment and surfaces.

Compositions that have a low pH are a problem for application to the skin of humans or animals such as teat dips because such acidity can cause skin irritation and burning. Additionally, acidic compositions can be corrosive to materials used in industrial equipment including metals, elastomers, plastics, cements and concretes, wovens, and so forth. Problems due to corrosion of equipment can obviously have a negative economical impact when chlorine dioxide is used as a sanitizer for industrial equipment.

Ecolab, page 2. In other words, Ecolab does not cure Madray's deficiencies because not only does Ecolab teach away from using lower pH levels, Ecolab also teaches using chlorite levels in excess of the amount recited in amended claim 24. Thus, Ecolab teaches away from the features of amended claim 24, e.g., achieving both low chlorite concentrations and rapid chlorine dioxide generation by reducing the pH of the second component to 5 or lower.

Accordingly, Madray and Ecolab, taken separately or combined, do not teach or suggest a system having two components, namely, a first component comprising a chlorite present in an amount less than 300 ppm (w/w of solution) and a first solvent; and a second component

comprising an activator present in an amount sufficient to reduce pH to 5 or lower and a reducing agent present in an amount less than 50 ppm (w/w of solution), and a second solvent, wherein upon combining the first component and second component, more than 1 ppm (w/w of solution) of chlorine dioxide forms within five minutes.

Hamilton also does not cure the deficiencies of Madray and Ecolab, as Hamilton does not teach or suggest increasing the speed of  $\text{ClO}_2$  generation by decreasing the pH of the system. Additionally, Hamilton does not teach or suggest the claimed chlorite concentrations as set forth above. Thus, the combination of Ecolab, Madray, and Hamilton, does not teach or suggest the subject matter of independent claim 24.

Accordingly, applicants respectfully request withdrawal of the rejection of claim 24 under 35 U.S.C. § 103(a).

Amended claims 25, 28-35, 39, and 43-46 depend from allowable independent claim 24, and therefore are also allowable. Withdrawal of the various rejections of claims 25, 28-35, 39-40, and 42-46 under 35 U.S.C. §§ 102(b) & 103(a) is, thus, respectfully requested. Claims 25, 28-35, 39, and 43-46 may contain additional patentable subject matter for additional reasons not stated herein.

Applicants respectfully submit that Ecolab, Madray, and Hamilton, alone or in combination, do not teach or suggest independent claim 71. Specifically, the prior art references, taken alone or in combination do not teach or suggest a multi component chlorine dioxide producing sanitizing and disinfecting system comprising a first component, a second component, and a third component, the first component comprising a chlorite present in an amount less than 300 ppm (w/w of solution) and a first solvent; the second component comprising an activator present in an amount sufficient to reduce pH to 5 or lower and a second solvent; and the third component comprising a reducing agent present in an amount less than 50 ppm (w/w of solution) and a third solvent, wherein upon combining the first component, the second component, and the third component, more than 1 ppm (w/w of solution) of chlorine dioxide forms within five minutes. Accordingly, applicants respectfully request the allowance of claim 71.

Claims 72-85 depend from allowable claim 71, and therefore, are allowable. Claims 72-85 may contain additional patentable subject matter for additional reasons not stated herein.

**CONCLUSION**

In view of the foregoing, Applicants respectfully submit that the claims are in condition for allowance. Favorable consideration of the present application as amended is therefore respectfully requested. If a conference call would be useful in resolving issues arising from the filing of this communication, please contact the undersigned.

Respectfully submitted,



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